

AVIATION WEEK

A MCGRAW-HILL PUBLICATION

MAY 9, 1949



Some commercial airports that have
recently installed or ordered
L-M high intensity runway lighting

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RALEIGH-DURHAM • ST. LOUIS • SALT LAKE CITY

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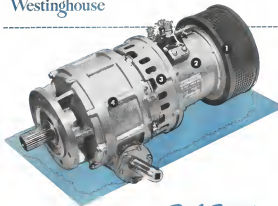
LINE MATERIAL lights more runways

*than do all other
high intensity runway lighting
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As the pioneer in the manufacture of high intensity runway lighting, Line Material Company is the recognized leader, both in the quality of its equipment and in the number of major airports using this equipment. The latest-type L-M units provide the very high intensity of 180,000 beam candlepower, without glare! L-M high- and medium-intensity lights are available for all sizes of airports, for major and secondary runways and taxiways. All L-M Airport Lighting equipment meets CAA specifications. Want more information on L-M Airport Lighting equipment? Ask the L-M Field Engineer or write Line Material Co., Airport Lighting Division, East Stroudsburg, Pa.

LINE MATERIAL Airport Lighting

YOU CAN BE **SURE**... IF IT'S
Westinghouse



Airborne weight lifter with *Real Stamina*

A leading aircraft manufacturer sought a better cargo hoist unit to expedite the loading and unloading of planes in the field in a vital cargo carrying operation. Specifications called for explosion-proofing, greater dependability and longer life than existing units.

Westinghouse was selected to do the job. The finished product, which meets and exceeds these self requirements, is illustrated above. Here are some of its advanced features.

1. Newly developed flame counter that makes the assembly explosion-proof.
 2. Fan-type web, specially designed, 4-c motor.
 3. Speed limiter for close regulation of up and down speed.
 4. Triple planetary gears for speed reduction.
- In addition, the unit contains a torque-limiting clutch and a magnetic brake for holding the load in case of power failure. Also separate construction of brake and speed-limiting device permits accurate "feeling" of the hoist for handling critical loads.

Weighing only 92 lbs., it is capable of lifting 5,100 lbs. at the rate of 24 feet per minute. Its unusually long life eliminates the necessity of carrying a spare so that both weight and space are saved.

A Westinghouse Engineer will be glad to give you further information or work with you on other special problems.

2-11157



Westinghouse



"She's all warmed up — set her on fire!"

These are familiar words at the Kidde proving grounds, where we deliberately start engine fires by the hundred. What's more, we start them in a pouring wind that doubles for a high-speed slipstream.

How do we do it?

With a pair of B-26 power plants set up in tandem. The propeller of the front engine sends the "slipstream" back through the rear nacelle, where we start the fires.

Why do we do it?

Because only by simulating, as closely

as possible, the actual conditions of high-speed flight can we determine the true efficiency of all the many fire-extinguishing agents. It's under conditions like these that we've blasted out engine fires with CO₂, CB, MB, DL, the Foam.

These "in-the-air" studies have provided us with a wealth of data on aviation fire-fighting—data which we are ready to pass on, at any time, to government agencies, aircraft manufacturers and airline operators.



The word "Kidde" and the Kidde are trademarks of Walter Kidde & Company, Inc.

Kidde

Walter Kidde & Company, Inc. • 518 Main Street, Bethlehem 9, N. J.

AVIATION WEEK, May 9, 1949

BRIDGE INTERNATIONAL AIRWAYS Into Chicago with the Southwest and South America. . . . But more than half a million passengers and over a million pounds of cargo annually through

builds US National Security Council Awards, proof that its "maintenance excellence" pays off. Engines of all kinds plus are lubricated 100% with Texaco Aircraft Engine Oil.



Simpler, Lower Cost Maintenance

Airlines everywhere are gaining greater efficiency and economy with Texaco's simplified lubrication plan.

AIRLINES have their preference for Texaco quality copoly on two factors: 1) Texaco quality and 2) Texaco Lubrication Engineering Service. Proof of Texaco quality can be set forth in just twenty words. *More revenue airline makes in the*

United States on four with Texaco Aircraft Engine Oil than with any other brand!

Proof that Texaco's simplified lubrication plan really works is found in the increased efficiency and lower maintenance costs reported by airlines using it — most of whom need only serve Texaco lubricants to handle all their lubricating jobs.

Let Texaco Lubrication Engineering Service help you simplify your lubrication procedures. Just call the nearest of the more than 2500 Texaco Wholesale Distributing Plants in the 48 States, or write The Texaco Company, Aviation Division, 250 East 42nd Street, New York 17, N. Y.



TEXACO Lubricants and Fuels
FOR THE AVIATION INDUSTRY

Two in . . . TEXACO STAR THEATRE presents ALLISON BEALE every Wednesday night! See newspaper for time and station.

AVIATION WEEK, May 9, 1949

THE AVIATION WEEK

Air Power and Congress

Congress is writing the nation's military policy. That is the meaning of the recent Congressional debate over the National Military Establishment appropriations bill for fiscal year 1950. This debate was one of the most significant in postwar years both for the country in general and for the aircraft industry in particular.

First, it indicates clearly how amazingly air-minded Congress has become. Much of the technical knowledge displayed in the debate comes from the World War II veterans now in Congress. Many a Congressman rising to debate the bill prefaced his remarks with "When I was flying B-24s over Europe" or "When I was with the Naval Air Service in the Pacific." With this background of experience it was not surprising to hear detailed discussion of aircraft performance and open discussion of many bitter wartime controversies over air power still clouded by the lingering fog of wartime censorship. It showed that Congress is intensely interested in the subject of air power, perhaps better informed than that subject than ever before, and determined to grow even better informed.

Bi-partisan bloc

Results of this debate proved that last year's overwhelming bi-partisan victory of air power over the older and now less important branches of the service was no dash in the pan.

Last year the 373-3 vote was led by a Republican majority. This year with the Democrats in control the margin of victory was 221-1. Clearly air power is not a partisan political issue on Capitol Hill.

The reiteration of the House of Representatives was unmistakable in taking the second step toward the expansion of American postwar air power begun last year. The House declared itself against the spendic "test and stop" policy of air power development proposed by the Executive branch of the government represented by the Secretary of Defense, the Budget Bureau and the President. It backed that contention with an additional \$551 million for air power.

Congress had made it clear that it now regards air power as this country's first line of defense and as such will give it the top priority so long denied it by the Joint Chiefs of Staff and the President.

Congress has also made up its mind on the long-mingling controversy between the type of air power represented by the U. S. Air Force and the brand portrayed by the Navy. It gave the Air Force a firm vote of confidence, indicating that while air power should have top priority, the Air Force should get top priority in the air power budget and the lion's share of aviation funds. That, too, was a decision that the Joint Chiefs of Staff had

been unable to reach in either their budget or strategic wrangling.

In fact, an more revealing picture of the current face of military budgetmaking has been painted than that sketched by Air Secretary Symington recently before the House Appropriations Committee. Symington told astonished Congressmen that when the Air Force voted up its 1950 budget it added up to only \$8 billion, including everything the USAF could wish for.

But word got around that the Army and Navy were pushing their demands up to \$10 billion apiece. So the USAF came up with an \$11 billion budget and the total proposed military budget hit over \$30 billion. The USAF padded its budget, Symington said, because they knew that any cuts imposed would be straight percentage slashes. Thus, to get an even break at the finish, the Air Force had to start out with a padded budget.

Symington Prophecy

How accurate a prophet was Mr. Symington? The final military budget allocated by the President to Congress split \$15 billion into three equal slices for Air Force, Army and Navy. Symington rebuked this distribution to the House financial watchdogs as an example of the absurdity of current military budget procedures. They agreed that it was a fine example of why the taxpayer's dollar is not buying the amount of security the taxpayers want and need.

Faced with the kind of "vote for you, vote for me" budget making by the Joint Chiefs of Staff, Congress did its own crude budgetmaking within the limitations imposed by the language of the appropriations bill by giving the USAF the \$851 million boost.

There were indications that Naval Aviation would have fared better if its budget had been separated from the Navy and considered on its own merits. For while the services against the super-carrier were strong, the general sentiment of the House was that it was giving the Navy \$5 billion and it was the job of the Navy not the House to see that an adequate Naval Air Service was maintained out of that sum. There was an understanding indicating that Congress felt the Navy does not give Naval Aviation the genuine priority it needs.

Also significant was a smattering of dissatisfaction with current military budget structure; the lack of uniformity on fixed matters between the three services; and the looseness with which the services dispose their annual appropriations. These shortcomings were bolstered by former President Hoover's specific charges of waste in the military services, including the construction of \$58,000 houses by the Air Force in Alaska.

While Congress is showing an increasing appreciation of the role of air power in national defense it is also growing increasingly curious as to what it does with the billions it dumps out for its purpose annually.

AVIATION WEEK, May 9, 1949

THE AVIATION WEEK

7



Aircraft Design Engineers Find

MICRO Precision Switches

Fulfill Rigid "AN" Requirements in Small Space

MICRO precision switches are widely used in aircraft designs where components must combine positive, dependable performance with utmost economy of size and weight.

Selecting just the proper MICRO precision switch to meet the specific demands of a particular application is simplified by the more than 9000 shapes, sizes, weights, accessories and electrical characteristics which MICRO SWITCH makes available.

MICRO engineers are specialists in solving switching problems. Their valuable aid is at the service of aircraft design engineers faced with the many switching problems peculiar to aircraft.



HEADQUARTERS: Chicago • New York • Boston • Cleveland • Los Angeles

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MICRO LMB-1 Housing
AN 3233-1



MICRO BZ-R31 Basic Switch
AN 3135-1



Size of case
1 7/8" x 1 1/2" x 1 1/2"

A single-pole, double-throw basic switch design with metal Army Navy connected end-calls.

For BZ-R31 (AN 3135-1) Basic Switch, the post aluminum body may be substituted (AN 3135-2) and rated "BC" in other drawings.

Lightweight but rugged housing with metal plunger. Switch enclosed within housing.



MICRO BZ-R31 Basic Switch
AN 3135-1



Size of housing
1 1/2" x 1 1/2" x 1 1/2"

MICRO V2-1 Switch AN 3234-1



Size of case
1 7/8" x 1 1/2" x 1 1/2"

Size of body
1 1/8" x 1 1/2" x 1 1/2"

B.C. Bellows: aluminum, 28.5 oz; stainless steel, 30 oz; copper, 28.5 oz; nickel-plated steel, 30 oz.

MICRO IVA-1 Relay Actuator
Housing



Size of housing
1 7/8" x 1 1/2" x 1 1/2"

For switching MICRO V2-1 Switch (AN 3234-1) through 500" total break 50" in other drawings.

MICRO 2VBI Plunger Actuator
Housing



For either one or two MICRO V2-1 Switch (AN 3234-1) switches. Plunger seated in separate indicator hole.



MICRO BZ-R31 Basic Switch
AN 3135-1



Size of housing
1 1/2" x 1 1/2" x 1 1/2"

NEWS DIGEST

DOMESTIC

Gen. H. H. (Al) Arnold (Ret.) would become general of the Air Force instead of the Army under legislation sent to the White House by Congress.

New manager of Telephones (N. J.) Airport is James R. Shays, appointed by Post of New York Authority. Fred L. Wilson, former manager, assumes as consultant. Shays had been liaison at Telephones for the Authority, which last year took over the field Area 2.

The American Airways reported one of its Skywaysmen from New York to London in 9 hr 16 min. for a non-stop commercial record.

Eno-Miles Sky Mailbox, Standard Oils (N. J.) DC-4, was to leave U. S. last week carrying 400 business men on a 14,450-mile round-trip to 14 countries and 19 cities in North Africa and Europe.

Ryan Aeronautical Co. received the price of the Navy for \$1200, from \$10,000 to \$11,900. Company and contract was due to higher cost of labor and equipment needed to produce improved 1949 model.

FINANCIAL

Southern Airways, Birmingham, is making public offering of 100,000 shares of common stock at \$5 a share to finance projected acquisition of its certificated feeder service line that month. Initially, 21-passenger DC-3s are to be used on company's Memphis-Memphis line.

North American Aviation's preliminary extended distance delivery schedule ended last March reported net profit at \$5,012,650 after taxes, against \$7,555,459 a year ago. Sales and other income for its, separate ended last March totaled \$767,310.

Boeing Airplane Co. reported \$577,017 net profit for last quarter of 1949. Sales for last quarter were \$55,155,150. Net earnings before taxes were \$917,017.

United Aircraft Corp. criticized its common stock, during for last 1949 quarter, after dividends on preferred, would be about 15 cents a share. First quarter net a year ago amounted to \$1.10 a common share.

FOREIGN

British European Airways plans for spring and summer include seasonal service between Western Germany centers, an addition to frequent night between cities and London.

INDUSTRY OBSERVER

Vice Admiral Arthur Redford, former deputy chief of naval operations and now U. S. commander in the Pacific, recently told the House Appropriations Committee that the operational radius of the Lockheed Neptune (P2V) was 2000 miles. This is the plane that holds the nonstop distance record of 11,236 miles from Australia to Ohio.

Air Force has successfully applied radio guidance in the 12,000-ft. "Tail Boy" launch. Work is under way on the application of control to the 21,000-ft. Grand Slam bomb, but lack of funds and opportunity for tests is delaying the application. These huge bombs may be controlled both in range and azimuth during their trajectory to the target.

Weight factor is now in the midst of an evolution of helicopter types in the developmental stage. USAF's main interest is in a rescue helicopter large enough to bring out crews of large bombers in a single trip.

Use of atomic acid as liquid fuel in new-type Aerojet JATO units will require USAF purchase of special tanker tenders capable of handling the acid in large quantities.

Wright Aeronautical Corp. is conducting extensive research tests on the Messner afterburner assembly for application to the Messner X-37 as well as numerous other turbojet units. The new afterburner is a fuel pre-heating system, a device of considerable controversy among propulsion engineers at the moment.

Construction is well advanced on the hulls and wings of three giant F4U-type Sikorski-Hopwood flying boats being built in the firm's Coast plant for operation by British Commonwealth Airways Corp. The 140-ton boats will be powered by 10 Bristol Proteus turbo-prop engines. Eight engines will be mounted in pairs on a single set of counter-rotating propellers. Two engines will be housed in separate units at each of the wing tips. First Proteus is scheduled to fly early in 1951. Second and third boats will be launched during the same year with four more to be built in 1952-53.

French Figeant's Compagnie Aeronautique Parallele at Sao Paulo, Brazil, has shut down after manufacturing about 1000 two-place Potebiere and Potebiere Carbons. Figeant blamed continued operational losses for the closing. All aircraft used in the Figeant were local products except the engines, imported from the United States.

Increasing cost of entering military design competitions was highlighted by USAF revelation that relies in its latest recent design competition for a medium bomber cost each of the 12 companies about \$200,000 apiece. Competitions were won by Boeing with the X-29 design and Lockheed power lost a few months later the project was quietly cancelled leaving the manufacturers with a total of \$1,400,000 in expense and not a nickel's worth of business to show for it.

Australian department of civil aviation has compiled a report on 22 engine failures on airline transports during a four-month period. All failures involved in single engine landings without damage. DC-3 type experienced 19 engine failures caused by oil leaks, piston failures, spark plug trouble, propeller governor failure and failure of front motor and bearing. Three Convair-Lear engine failures were caused by spark plug trouble.

Liaison change for appointment to the Civil Service Commission is AEA's Executive Vice President Robert Ranspach. Commissioner Harry Mitchell is expected to resign, but probably not for several months. Ranspach formerly served as chairman of the House Civil Service Committee. Pending legislation would boost salaries to \$17,500, which approaches Ranspach's \$13,000 salary from AEA. Appointments to CSC are for an indefinite period.

inflated points, the all-cargo carriers are free to serve only those places that appear to offer profitable loads.

Losses experienced by the all-cargo lines are likely to increase further than desired in the future, Jones warned. He pointed out that the independent have been able to concentrate in the port through use of rapid planes positioned at piers for before replacement costs. Pilots and other personnel have not been increased, and some company officers have received no salary.

Johnson's Role May Be Strengthened

Senate Armed Services Committee has tentatively approved legislation strengthening the authority of Defense Law Enforcement Control over the armed forces.

The committee's bill would:

- **Divide the Departments of Air Force, Army, and Navy** from their present status as "executive" departments to "military" departments, clearly independent of the National Military Establishment—which would be renamed the "Department of National Defense."

• **Give the Secretary of Defense** sole authority to coordinate the prosecution and research activities of the three departments—as well as their supply, personnel, health, and transportation activities.

• **Eliminate the Undersecretary of Defense** (Stephen Early) to Deputy Secretary of Defense—then giving him title, as well as functions, previously over the operations of Army, Navy, and Air Force.

• **Provide the Secretary of Defense** with three "instruments to the secretary." The President's proposal to create three assistant secretaries for the Secretary of Defense was rejected by increasing the number of assistants in the department.

• **Shift top-budget status** in order to make them comparable with rank. The Secretary of Defense would receive \$15,500 a year (as at present), the Deputy Secretary of Defense would receive \$14,500 (compared with \$12,000 at present) and the secretaries of Army, Navy and Air Force would receive \$14,000 (compared with \$11,000 at present).

• **Create a "staff" of the three Joint Chiefs of Staff.** However, his review would be limited to two years, he would have no role in military strategy proposals, and his own function would be to handle information from the three Joint Chiefs of Staff to the Secretary of Defense and the President for his decision.

The measure details in law, for the first time, a leadership role for the Defense

NACA at Work

More effective in U. S. aircraft research

One element in the results that find practical application in planes, America is the status of work of the National Advisory Committee for Aeronautics, the country's largest and official research agency.

NACA's efforts in the past fiscal year are measured against practical applications of its discoveries in its Aviation Week exclusive feature on page 21, this issue.

Secretary's control. It explicitly prohibits the inter-service transfer of military personnel from one department to another. The 1947 War Relocation Act went so far as to limit the transfer of military personnel between the services.

• **Tydings Bill.** Sen. Milford Tydings (D., Md.), however, is opposed to the legislation. After his committee reported it, under the pressure of Navy Department opposition that Naval and Marine aviation were about to be transferred to the Air Force, Tydings withdrew. Military rules and customs are another for the high military officials to decide on their merit and not for the Congress to decide in all its glory. And not only Congress lets the military make their decisions, will there be a real "war?"

Tydings subsequently introduced legislation authorizing the President to make with service branches of common interest of the services, with the consent of the transferred offices, and both the service from which and to which it is transferred. The legislation was accompanied by the Air Force and approved by the Secretary of Defense.

Paper Sets Pace

Some time for leadership in personal plan late between Power and Center continued in April with Paper regarding the lead, after Cressa had held it in March. Paper reported 111 miles including 32 of the four plane chapters, while Cressa led 188 miles including 76 per plane 170, 20 five plane 164 and only 12 twoplanes.

Official results for other companies for April included: American 61, including 35 Section, Ryan, 49, Luccombe, 37, Beach, 26, Zionsdale, 9.

Analysis of reports received from the Federal Aviation Board of Aircraft Industries, Inc., shows four plane planes strongly predominant in April with 307 four planes out of a total of 410 reported.

Broken Rotor Cause Of Gyrodyne Crash

(McGraw-Hill World News)

LONDON—A broken rotor blade apparently was the cause of the recent crash of a Four Aviation Co.'s Gyrodyne. Although the official investigation is not yet completed, informed sources are positive that one of the blade broke—out at the root, just some inches between that point and the tip.

It was the first fatal helicopter crash in Great Britain, and killed Porter Dimes, chief test pilot of the Gyrodyne, and D. G. Conway who served as flight test observer.

The accident occurred last month while Dimes was testing the craft preparing for an attempt to set a speed record for a 100 km. flight. The Gyrodyne held the world record for the 100 km. straightway run (224.4 mph) just broken by a Sikorski 5-52-1.

Foury said that the cause is identical with further development of the Gyrodyne.

WAA Speedup

Speedup of disposal of remaining surplus aircraft components in War Assets Administration hands is scheduled within the next few weeks as a drive to clean out all WAA aircraft property by June 30.

Remaining WAA inventory of aircraft components with original value of \$450 million has been tied up since last fall in a warehouse by Air Force and Navy, to select equipment for service use. Air Force has selected approximately \$12 million worth of components and Navy about \$3 million. It is expected that the remaining will be completed shortly.

Two Part Process—Disposal of material accumulated by the services will be a two-part process. WAA agents who have already sold large quantities of the surplus material will be asked to take additional consignments, and material left will be scrapped.

War Assets recently owned 157 transport airplanes which are listed to commercial airlines and to other government agencies. When these are released at the expiration of contract leases they will either be sold outright, or turned over to the National Military Establishment.

June 30 deadline for complete disposition of WAA-held aircraft and materials in part of administration planning expected to result in transfer of remaining WAA facilities at that date to the Federal Works Administration. Recent appointment of J. W. Lawson, former WAA administrator, as head of the Federal Works Administration, is a foreboding sign of change.



Above and top right, the Hawker P. 1031; below right, the Supermarine 510

British Jets

Experimental planes of Hawker and Vickers built for sonic speed.

LONDON—Two experimental swept-wing jet fighters—the Hawker P. 1031 and the Vickers A.10, designed by Supermarine 510—are top contenders here to exceed Mach 1, so far achieved by the British only with the de Havilland D. 11. Both are powered by Rolls Royce Nepean turbojet engines of 5900 lb thrust. The Hawker design has been flying since early last fall, the Supermarine since only this year. The swept-wing planes, both are based on straight-wing versions that have been flying for an even longer period.

• **Rolls Modifications**—The Supermarine 510 is a modification of the A.10 fighter which was demonstrated at the first postwar exhibition of the Society of British Aircraft Constructors in September, 1946. The Hawker design is a further development of the P. 1040, which made its first flight a year later. (Aviation Week, Nov. 13, 1946).

The Hawker P. 1031 has the same fuselage, cockpit and tail as the same wing configuration, as well as the same split air inlet and balanced track jet exhaust. Both planes seem to have the straight wing root panel with a twisted-on swept wing outer panel.

• **Some Parts Identical**—New Supermarine design has a sweptback tail, fuselage and main wing. Fuselage, air inlets and jet exhaust appear identical with the earlier version.



The straight-wing Attacker, joined by the RAF, is now in production for the Royal Navy, with modified swept-wing type to test it on a carrier's deck. Official estimate of the

Royal Navy's order is placed at 70. Such swept-wing fighters were ordered by the Ministry of Supply to investigate problems of high-speed flight "at and beyond the speed of sound."

Sherman Fairchild Wins First Round

Management of Fairchild Engine & Airplane Corp. will again this week to add the negotiation's annual meeting. And the leader of the opposition, Sherman Fairchild, thinks he can cause another postponement.

Initial results of his last-minute postcard and letter campaign to the top stockholder opposition in the employment contract of Fairchild E & A President J. Carlton Ward, Jr. (Aerospace Week, Apr. 25), was successful.

The meeting was scheduled for 1 p.m. 3:30 P.M. Apr. 27 at Hightstown, N.J. Two months before, two weeks before, and at the time the meeting was called, it was held. When the meeting was called, it was held. When the meeting was called, it was held.

Last week, prices and movements were flying back and forth between the two sides like a hot air balloon. In doing so, the company declared that Sherman Fairchild was trying to dominate the management. "The only really workable way of successful management in the middle of the 20th century" is what he said.



BIGGER PACKETS MOVE OFF LINE

First production models of the Fairchild C-119 are being shipped by the Air Force. Plans, shown at company's Hightstown, N.J., office.

Several floors above in New York's RCA Building, Sherman Fairchild was still rising, and getting, many more votes, and getting, many more votes, and getting, many more votes.

The immediate plan

- To block the Wednesday meeting and any subsequent meetings, the company will call, unless it is willing to deal with the Sherman Fairchild group.
- To round up a committee of stockholders which will pass a slate of directors in opposition to the management's slate.

Sherman Fairchild's spokesman declared the former corporation head will not lead the stockholder committee, nor will he accept any position with the corporation.

Aircraft Rise

Output of completed aircraft increased during February by 47 percent over January, according to the monthly report on the aircraft industry by the Bureau of the Census.

Aircraft weight, completed during February totaled 1,375,100 lbs. compared to 2,281,100 lbs. in January. May 1945 aircraft delivered totaled 2,577,000 lbs. in February compared with 2,000,000 lbs. in January. Total of 257 civil aircraft valued at \$15.5 million were de-

livered during February compared with 260 planes valued at \$1.6 million during January. Annual planes accounted by 216 of the 257 total with the remaining 41 being transports.

Engine license-engine production also increased during February with a 20 percent gain over January. Total engine license production completed was 2,316,100 compared with 2,418,800 for January. Military shipments accounted for 95 percent of the February engine shipments. Civil aircraft shipments during the month had a value of \$9.4 million compared with \$5.1 million in January. Employment in both aircraft and engine plants remained relatively stable during February.

More Payload

Lockheed Constellation has been approved by Civil Aeronautics Administration for increased payloads up to 4,000 lb. over present maximum. Maximum allowable aircraft weight has been approved from 102,000 to 107,000 lb.

Current net weight will be able to take Constellation as a 4,000 lb. payload, but will not require. Maximum allowable landing weight has been increased to 86,000 lb.

Improved performance will be gained by landing gear and engine, gear, and by widening to Curtiss Electric 510 high activity factor power.

With these modifications an airline flying the North Atlantic could increase the payload from 12,400 to 14,000 lb. for the 10,000 miles between Glasgow, Ireland and Canada, Newfoundland, against a 60 mph headwind. For other routes, payload was 70-60 percent greater than these figures carried.

Slope Line Approved

National Road has approved the slope line system of high intensity approach lights in the standard for use on military and civil airports. The slope line lights are designed by the Civil Aeronautics Administration, lights on the direction of J. J. More. Mr. More, National Road approval was given despite a minority report by the Air Force. Air Force report was given by the Air Force. Air Force report was given by the Air Force.

Way, Way Up

The 45-ft Viking model climbed to an altitude of 514 ft. at White Sands Proving Ground, N. M., last week.

The model, a Navy development built by Glenn Martin Co., is designed to carry instruments above the atmosphere for course or research. Subsequent flights are expected to reach altitudes at 208 mi or more.

Sale of Plant Helps Bell Cut 1948 Loss

Substantial recovery during 1948 from its postwar loss was indicated by Bell Aircraft Corp., which reported a doubling of its building assets during the year.

Bell building increased from \$16 million in the spring of 1948 to a total of more than \$30 million on Apr. 15, 1949.

Company reported net loss for 1948 of \$147,127. Operating loss of \$1,050,961 on sales of \$15,328,281, was reduced by profit of \$600,732 net of Bell plant in Burlington, Vt. The 1948 figures compare with total assets of \$14,111,400 and net loss of \$1,050,961 for 1947.

Equipment—Working capital at the end of 1948 was \$10,053,641. Bell was recovered \$2,955,573 on reorganization agreement for 1949. A 51 dividend was paid to stockholders of record last Dec. 28.

Bell's aircraft building is presently working on the Bell X-1, two place helicopter for the Army, the YH-1 helicopter for the Air Force, and the X-1A and two X-2 experimental aircraft, research and development contracts with USAF and Navy's Bureau of Aeronautics, for military, convertible bomber and rocket engine, and materials of the Boeing B-47 subcontract work which the company is performing.

Bell's conventional helicopter sales amounted to \$1,045,000 for 1948 with almost half going to foreign buyers. Among new helicopter orders are two for an Alaskan island for transport, survey and mail service in the Chicago area this summer. Bell also operates a fleet of conventional helicopters under contract to aid military for security, survey, fire fighting, and other surveys of difficult terrain in Texas, Louisiana and the Gulf of Mexico.

Prime Motor sales for 1948 totaled \$798,026 with the building industry the principal customer. Bell's sales campaign for this year is now being extended to manufacturing and processing plants, railroad, military installations and parks.

During 1948 Bell delivered 65 H-13B two place helicopters to the Army, 12 H-12 two place helicopters in the Navy and five five-place XH-15 to the Air Force.

Air Taxi Service

Later American Corp., Port Columbus, has established an air taxi service for the convenience of businessmen and visitors on sales trips, for emergency flights and for package delivery.



Sikorsky S-52-1 at Cleveland Airport being offload new world mark of 129,616 mph.

Copter Sets World Speed Record

Sikorsky S-52-1 establishes rotary-wing craft mark of 129,616 mph.; record previously held by Britain.

Helicopter speeds record another wing up the ladder to become more closely competitive with those of fixed wing aircraft last week when a two-place Sikorsky S-52-1 with a 247 hp Franklin engine, established a new world speed record for rotary wing craft of 129,616 mph.

Record was made by Thaddeus Thompson, co-engineer and demonstration pilot in Stirling, on the 1.6-mile measured course at Cleveland Airport. Speed was the average of four consecutive downwind and upwind passes over the course cut of a total of eight runs.

Sikorsky Record—Thompson averaged for this run a record formerly held by the 100 hp. British Fairey Gyrodyne, although the new record does not set a new official world airspeed and is reported by the NAA contract division and the Fédération Aéronautique Internationale Gyrodyne record of 124.1 mph. was set last June by RAF Squadron Leader R. H. Adell.

Two months ago, probably during the Sikorsky helicopter tests equalling the 115 mph. it has reached in similar official trials a gusty 17 mph. west wind, and a team straining on the tail rotor beam, which contributed to the record.

The non-landing Sikorsky is the new craft which Thompson headed as the Pilotage in Washington last summer (Aerospace Week, June 28, 1948) is a demonstration for military authorities.

As an observer, Mr. John Brown of Army Field Force, Ft. Belvoir, N. C., on observer at the Cleveland flight, indicated that the record service is showing helicopter development closely

to use in observation reconnaissance and execution.

Charles S. Langdon, NAA contract director, supervised the timing of the record flight, headed by William L. Loe of Academy of Aeronautics and Field Control, mechanical engineer of the Bureau of Standards.

Martin Reports Profit

Consolidated net profit of \$402,645 for the first quarter of 1949, was reported by the Glenn L. Martin Co., Baltimore, at a meeting of directors recently. Profit compares with a consolidated net loss of \$406,362 for the first quarter of 1948.

Consolidated net sales for the first quarter of 1949 totaled \$12,283,265 as compared to \$16,076,860 for the first quarter of 1948.

Executives of Maple T. Bell, chairman of the Federal Deposit Insurance Corp., Washington, and Everett H. Pader, vice president of the National Bank and Trust Co., Pittsburgh, in the Martin Board of Directors, was announced.

Referred to the board were Glenn L. Martin, president; Harry F. Rowlett, executive vice president; G. T. Walker, vice president; manufacturing, Morgan T. Schenck, Jr., vice president and controller; and Howard Brier, member of the board, and vice president, Baltimore National Bank.

Maple Bell quarterly deliveries were in New planes, AM-1A Mustang attack bomber and JRM-5A Marine patrol amphibious transport, a plane now produced by the Martin Aircraft Division, Pittsburgh, Ohio, also being delivered in quantity.

Military Sales Push Douglas Profits Up

Further evidence of strong rise in military aircraft sales of aircraft manufacturer, its first quarter of 1949 reported by Douglas Aircraft Co.

Sales for this period were \$15,865,483, compared with sales of \$15,251,343 and profit of \$1,367 for the same period in 1948. Other aircraft manufacturers reported a first quarter profit for 1949 include Convair and Glenn L. Martin Co., both heavy losses in 1948.

Douglas reported a backlog of \$111,314,000 in April 1, compared with \$132,949,800 last Dec. 31. Only 2 percent of the current backlog represents commercial business with the balance split between 34 percent in Navy contracts and 64 percent in Air Force work. Working capital at end of the quarter was listed at \$54,276,691.

Earnings Expected—Douglas first quarter profit represented a net of 8 percent on sales and the equivalent of average \$3.94 per share on the 608,000 shares of capital stock outstanding.

Douglas is still pushing its sales campaign on the DC-6 airliner with more foreign sales expected. Douglas also anticipates a substantial foreign market for its Super DC-3, the \$158,000 conversion of the DC-1 into a competitor of post-war two-engine transports. With the price of such equipment now around \$190,000 per plane, many of Douglas DC-3 operators cannot afford to buy new transports and are expected to use the Super DC-3 (Aviation Week, Apr. 18) to modernize equipment.

Douglas is also building the DC-46, a 39,000 lb payload airlifter for the military and commercial use. The C-124A, a military transport for the Navy (AD section), also is being ordered by the Navy (OTD section). Navy night fighter, the X-3 experimental research plane, and the XA-10 turboprop-powered experimental Navy carrier bomber.

Bell, Martin Hit By Boeing B-47 Cutback

Boeing Airplane Co. has cancelled about \$75 million of its \$115.5 million in subcontracts on the B-47 Stratojet bomber.

Although Bell Aircraft Corp., which lost \$3.5 million subcontracts; Glenn L. Martin Co., which lost a \$1.2 million subcontract for dorsal and vertical fins and radars; and Airplane division of Cessna-Wright Corp., which lost a \$1.1 million subcontract for scheduled and floor.

Hits Seattle—Boeing cut back its subcontracting program on the B-47 to

put the work into its Seattle plant where the program for building 48 B-54 bombers was actually cancelled by the Air Force.

Boeing says it needs the B-47 work to keep its Seattle labor force occupied after the end of the current B-50 bomber program. B-47 will be assembled at Boeing's Wichita plant.

Bell lost its subcontract for horizontal and vertical stabilizers, elevators and struts for the B-47 but will continue to make power packs for the B-47's tail-boom 147 jet engines.

Convair Deal—Bell also received a \$1.5 million subcontract from Convair to make motor power packs for the B-54 which will also use the 147 jet engines. Convair's B-54 subcontract is expected to be expanded as soon as USAF fiscal 1950 funds become available. USAF now plans to equip 175 B-54s and B-57s with the jet engine pack.

Boeing B-54 was initially B-50 ac-

British Goblin Ends 1000 Hr. Test

De Havilland jet engine undergoes grueling trials on ground test bed and in simulated combat conditions.

British de Havilland Goblin Mark II jet engine, rated at 1000 hp static thrust, recently completed a 1000 hr. officially scheduled trial. Trial was conducted on a ground test bed and simulated operations under service conditions. It is believed to be the most taxing test ever run on a jet engine.

The continental de Havilland was demonstrated at the 900 hp mark for inspection. Approximately 10 percent of the parts required replacement, generally those taken that were designed for 100 hr. of operation. Small fragments of the flame tubes were found to have been burned out during the first 500 hr. causing damage to the static turbine blades subsequent to engine fire replacement. Replacing turbine blades were also slightly bent but not sufficient to require their replacement. During the second 500 hr. the flame tubes were replaced at the end of 500 hr.

The 1000 hr. test included 924 combat sequences including full power take off, maximum climb, cruise and then full maneuvers at full combat power, jet down and then jet maximum test. The test sequence took 75 minutes. Test included total of 100 hr. of full power, 75 hr. of maximum climb, 540 hr. of maximum cruise and 594 hr. of maximum maneuver.

The Goblin Mark II used for the test was a standard engine taken from a shipment to the Royal Air Force a

few months ago. The engine was powered by four Pratt & Whitney VDT powerplants which were expected to give the bomber greatly increased range with reduced fuel consumption. USAF procurement officials described the B-54 contract as a "bridge against 4-16 performance" and indicated that it was no longer needed since the later model B-56 had proved their performance capabilities.

Filling the gap caused by cancellation of the Boeing B-54 bomber program had also resulted in transfer of work from Boeing Wichita to Boeing Seattle plant.

Trunkman machine tools, sub-assemblies, parts, and materials for B-56, C-117, and Stratojet are made down, and finally key down, the power components and nacelle static tools for the B-56. Trunkman will not require replacement of the Wichita working force and space vacated will be filled by new jobs and the new jobs for B-56, C-117 and Stratojet.

Boeing B-54 was initially B-50 ac-

tioning. No special components were used in the test engine. Maintenance during the test required only 60 man-hours. De Havilland is working on a new type flame tube that will be used on all types of the Goblin and Goblin engines.

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AVIATION WEEK, May 8, 1959

ENGINEERING



Important elements of intensive NACA research are embodied in Douglas supersonic D-558-II. Features indicated by arrows include wing fence to improve longitudinal characteristics of airfoil below stall, back air inlet, and best contour wing on pitot-static probe.

NACA Lowers High-Speed Flight Hurdles

Agency's annual report sums up lessons learned after first supersonic flight gave new urgency to research.

By Robert McLaren

Research results are an accurate index to future design progress. These theories, devices and methods now in the research laboratory will characterize the military airplane three to five years from now, and the commercial craft some seven to ten years hence.

Because of this, a fairly reliable picture of the 1955 fighter and the 1958 transport is contained in the 14th Annual Report of the National Advisory Committee for Aeronautics, covering its operations during the fiscal year 1949. **Historic Goals**—Significantly, the first flight of a man-carrying airplane at speeds faster than sound was made early in the period covered by the report. With this historic goal, NACA found a new and compelling urgency in scientific aeronautical research. This thrust is the report.

"This achievement may be the most significant event in aeronautics since the Wright brothers' first flight," says Dr. Jerome Clark Hunsaker, NACA chairman. "Clearly it is a step in the direction of future conquest of efficient aircraft." Further, "Part of us as known since better has been displaced by a better knowledge of the possibilities of supersonic flight." "In new areas possible to build aircraft which can be

fully controlled within the transonic regime."

Problems Made Harder—There are four basic scientific aeronautical problems in the solution to transonic flight. Consequently, these comprise the four fundamental areas of NACA research: aerodynamics, powerplants, construction and operations.

These problems are complex enough at the present time. Solving them will be the immense task which faces the complexity to an extent not even yet known. But NACA reveals considerable progress during the past fiscal year on these problems. Highlights:

AERODYNAMICS

Wings of aircraft designed to fly at transonic Mach numbers are, in general, characterized by thin airfoil sections, as used in most cases, low aspect ratio and considerable sweep. The maximum lift coefficients normally ob-

tainable with such wings are low. A number of investigations have therefore been conducted by NACA laboratories with the objective of improving the characteristics of wings of various planforms appropriate for use in high-speed aircraft.

Results—Principal conclusions of these studies: maximum lift coefficients in the neighborhood of 1.3 to 1.6 (depending on the angle of sweep) can be obtained with the best combinations of split flaps and leading-edge devices investigated, insofar as maximum lift is concerned, the importance of the actual section decreases as the sweep increases and as the thickness of the airfoil decreases.

Leading-edge **Nighthawk** devices are shown in most cases to be effective in improving the aerodynamic characteristics of the wings in the high-lift (take-off and landing) range.

Theoretical calculations indicated that a wing of the highest possible aspect ratio with sweepback of 60 to 65 deg. should be capable of Mach numbers up to 3.5 of sustaining lift. Eff-

Index to Full Data on NACA Research

In its several reports, the National Advisory Committee for Aeronautics presents a few references, or in a paragraph, work of research interest and importance to the aviation industry. Most of this work already has been spotlighted and explained in detail in **AVIATION WEEK**. The references in the text are keyed to these stories, a list of which appear at the end of the article.



McDonnell-Douglas NF-46B wing tests differ in shape from D-158-II's, a booted hybrid outflow

comes comparable to those of lighter planes at subsonic speeds. A wind-tunnel program was undertaken at the Ames Laboratory to determine the aerodynamic characteristics of a 61 deg. sweptback wing throughout the speed range available in the various facilities. These tests have indicated only minor effects of compressibility at the highest Mach number tested.

► **Foreign Wings.** Of the wing plan forms suitable for flight at moderate supersonic speeds, triangular wings combine the structural efficiency of low aspect ratio and high taper with the aerodynamic efficiency of a highly sweptback leading edge. Tests of a wing of triangular planform of aspect ratio 2 indicate that no serious longitudinal stability problems would be encountered in flight with such a wing at the highest Mach number reached.

The L/D ratio at the leading condition were very small and, for the configuration tested, it is indicated that a landing without power would not be feasible.

Wing sweep is beneficial in delaying the effects of compressibility as long as the wing is swept behind the Mach cone. Above Mach 2 sweep is no longer structurally feasible because of the large amount needed to get subcritical flow over the wing.

► **Better Than Boomer.** At these Mach numbers, calculations show a much more sharply edged wing without sweep may be superior in performance to a swept wing which is not swept behind the Mach cone. To investigate such a straight wing at high subsonic speeds, tests have been made in the Ames 14-in. pressure tunnel of a wing of aspect ratio 4 and taper ratio 0.5 with a very thin representative airfoil section.

As is usually the case with swept wings, the aerodynamic center of the wing moved forward as Mach number below the critical. Because of the coexistence of low aspect ratio and co-

terribly small wing thickness ratio, the total movement of the aerodynamic center was small for the Mach number range tested.

► **Boundary Layer.** NASA continued its expansion of boundary layer control research, indicative of the increasing interest in this device as a means of increasing lift and/or reducing drag. One of the important results of the year was a comparative study of boundary layer flow at transonic and low speeds. This indicated that a swept front portion of low-speed boundary layer theory could be extended for application to transonic flow.

The stalling characteristics of some moderately thick airfoils are characterized by a relatively low maximum lift and an abrupt loss of lift at angles of attack greater than that for maximum lift. The failure of these airfoils to produce greater lift without an abrupt loss of lift before maximum lift is attributed to complex laminar separation occurring very near the leading edge of the airfoil.

In an attempt to improve these conditions an investigation was made at the Ames Laboratory, the results of which indicate that the optimum technique for increasing lift is the combination of a point of maximum pressure and in the immediate vicinity of the laminar-separated bubble at maximum lift.

► **Flap Experiment.** Since boundary layer control is most effective when used in conjunction with properly designed flaps, an investigation at the Langley two-dimensional low-turbulence tunnel of a thick airfoil with double-slotted flap was made. Results show that the maximum section lift coefficient was increased from 2.4 to 3.4 by deflecting the flap and the application of suction at 0.65 chord further increased this value to 4.2.

With the flap retracted, boundary layer control provided maximum lift/drag ratio increase of 46 percent on the

smooth airfoil and more than 160 percent on the airfoil with leading edge roughness.

However, a performance study indicates that when the wing aspect ratio is made considerably larger than the present typical values, such potential in terms of boundary layer control is reduced to an appreciable extent.

► **Tan Uts.** One of the most promising aerodynamic uses of boundary layer control is not on aircraft at all but in the wind tunnel. The closed wind tunnel placement of "blowing" has effectively prevented accurate research at the speed of sound, although such devices as the wind tunnel "bump," small models or large tunnels, etc. has permitted accurate data closely approaching Mach number 1.

A study using the hydraulic analogy method showed that blowing of the wall boundary layer in the region of the model appreciably increased the choking Mach number. Section data in the vicinity of the test model was effectively used for this problem.

► **Stability and Control.** An investigation in the Langley 8-ft. high-speed tunnel at downstream angles behind straight and swept wings indicated that although the downstream characteristics behind the swept wings are similar to those of the straight wing, the changes in downstream were delayed by sweep. This delay corresponded to the delay in critical Mach number associated with the sweep.

A study of various V tail arrangements with the Langley 7 by 10 ft. tunnel showed that a 47-deg. V tail contributed 46 percent more longitudinal and directional stability and 90 percent more dihedral effect than the conventional tail based on the same body wing area and area, despite the fact that the V tail had only about 15 percent greater area than the conventional tail.

In addition, sweptback V tail configurations appear to provide the same amount of stability with less area than swept conventional tails.

► **Wing "Fences."** An investigation at the Ames Laboratory at 0.45-deg. swept wing of aspect ratio 4.5 with this experimental device indicated that "fences" parallel to the wall station in the upper surface of the wing would improve the longitudinal characteristics of the wing below the stall, but would not improve the characteristics at the stall.

The use of split flaps gave only a slight increase in maximum lift, and no improvement in longitudinal characteristics at the stall, while chord extension flaps gave feasible increases in lift coefficient but caused nonlinear lift and pitching-moment characteristics.

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sensing and control systems were considered inadequate to meet satisfactorily either current or future gas turbine engine control requirements, an investigation was conducted to study various new temperature sensing and control systems. A new pressure-sensitive temperature control system was evolved, and it offers much promise in providing accurate, high-response-rate temperature signals up to temperature levels of approximately 1000 F.

► **Fuel System**—A new type fuel system for gas turbine engines, comprised of variable-area bleeding nozzles and a distributor mounted, has been assembled and found to produce finely atomized sprays over a much wider range of fuel-flow rates than conventional fluid-injection fuel nozzles. First fuel passers also were reduced to approximately one-half the value of those now in current use.

The fuel-distributor control was found capable of adjusting fuel-flow rates to each stroke within ± 1 percent of the average value.

A flow valve in the distributor control functioned perfectly to eliminate fuel flow to any nozzle line that had ruptured. This feature would permit an engine to continue in operation at near maximum output after several fuel lines had been severed through breakage or battle damage, whereas a break in current fuel systems will cause immediate engine failure and introduce a serious fire hazard.

► **Jet Fuel**—Investigation of various fuel types under different turbulent engine operating conditions has shown that of simulated high-altitude conditions one type of hydrocarbon fuel will give a combustion efficiency markedly greater than another type of hydrocarbon fuel. Further refinement of several thousand test on simulated altitude operational limits have been obtained with two different fuels in the same combustion.

On the order of the NASA Subcommittee on Aircraft Fuel the military services tentatively indicated a fuel for aviation gas turbines which would permit maximum utilization of available grade of jet engine to aircraft gas turbine fuel. The performance of this fuel has been investigated in several control types of turbine power plants under altitude conditions.

► **Compressor**—An axial-flowing axial-flow compressor was investigated in order to study the possibilities of combining the compactness, reliability and wide operating range of a centrifugal compressor with the high-flow capacity and cost of axial and that distinguishes the axial-flow compressor.

This axial-flow axial-flow compressor exhibited a wide operating range over the entire speed range and the



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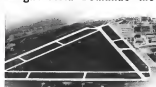
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An inlet in wing root of McDonnell F1B2 aircraft shown tested by NACA (page 36)

performance was in close agreement with that predicted by the theoretical design.

Compressor operation at low air flows for a given speed is limited by unstable flow conditions, commonly called "surge." In and flow gas turbine engines, the compressor surge problem becomes critical because the surge of compressor operating flow is so small that the engine operating point is very close to the compressor surge point.

A investigation has been conducted to determine the surge characteristics of a 10 stage and flow compressor. All the stages started surging at approximately the same time and, although the end of surge was not clearly defined, all stages appeared to stop surging at approximately the same time. As the compressor speed was increased, the amplitude of pressure fluctuations increased and the frequency decreased. The frequency of fluctuation was particularly unaffected by inlet air pressure, but the amplitude increased as the pressure was increased.

Recently on the supersonic compressor, which had previously been extensively investigated only in F-105-12 (in which the speed of sound is only about 340 mph), was evaluated in jet engines in air. The general performance closely paralleled that obtained from the 24-in diameter engine operated in F-105-12, and the detailed flow measurements indicated that theoretical supersonic performance characteristics were closely approached.

► Turbine "Partial admission" has been studied as a method of obtaining efficient part load operation at power regulation of a gas turbine engine. It was found that efficient turbine performance could be obtained up to a blocked angle as of 180 deg. When the turbine section was blocked further, it was noted that marked losses in efficiency occurred.

A method was developed by which overall turbine efficiency and power output for any degree of admission can be calculated at the performance at full admission is known.

Twelve cooling conditions in a passing method of generating higher operating temperatures with cooling in contact is specific power output and reductions in specific fuel consumption. The net horsepower output per pound of air is approximately doubled by increasing the gas temperature from 1300 F to 2500 F.

The results of an investigation showed that a liquid-cooled turbine wheel of a high-conductivity material, such as aluminum alloy, can be satisfactorily operated at gas temperatures appreciably higher than those now in use. However, oxidation of coolant made the turbine blades require that thicker blade shapes be used, which in turn leads to a completely new approach to the technique of blade design.

► Rocket-Charts are prepared for the measurement of equilibrium composition of chemical reactions in the carbon-hydrogen-oxygen-nitrogen system at temperatures from 2000 to 5000 F, and the most promising propellant combinations are being concentrated on those evolved with regard to their handling properties and their performance in solid-rocket motor engines.

Propellers investigated after the possibility of greatly increasing the range of rocket-propelled vehicles at composed with alcohol and liquid oxygen.

Jetting of the solid rocket engine and nozzle with a constant flow is required to maintain and other means of protecting the wall of the engine from the heat of combustion products are being investigated.

AIRCRAFT CONSTRUCTION

To investigate the problems that might be encountered in the design of wings with large angles of sweep, a box beam representing the main structural component of a two-engine two wing V-biplane wing with the normal to span was subjected to symmetrical tip

loading and its stresses and distortions were measured.

The investigation revealed that the stress phenomena peculiar to sweep are confined to that portion of the wing near the leading edge, the stresses in the main portion being given with reasonable accuracy by the standard formulae for straight wings. The major effect of sweepback on the stresses is to cause a concentration of normal stress and vertical shear in the rear span.

The investigation indicated that distortions may be estimated by considering the outer portion of the wing as a cantilever and superimposing on the cantilever rotations rigid-body movements due to flexibility of the ribbed portion to which the cantilever is attached.

► Flat Plate Buckling—Buckling of the stressed skin of a wing under applied shear loads results in a reduced structural stiffness and a reduced aerodynamic efficiency of the wing.

The problem of determining the shear stress at which the nominal shear of the wing buckles at of particular importance in the case of high speed aircraft, which are normally subject to flutter and control problems. The wing panels of high speed aircraft are usually narrow and reinforced by relatively few stiffeners. Reinforcements were made to determine the shear buckling load of long plates reinforced by one or two longitudinal stiffeners.

In addition, a theoretical solution was obtained of the problem in the case of stiffeners. The results of the tests and the theory were compared and found to be in fair agreement.

The fabrication of skin and stiffeners as one integral and by extrusion or some other process would greatly simplify the construction of wing compressor grates. It also offers possibility of achieving a smooth, highly efficient structure by eliminating the deleterious effects of riveting stiffeners to skin. A structural solution was made of such an extruded panel constructed of

navigation alloy by the Dow Chemical Co. The analysis showed that the post had structural characteristics which lay approximately midway between those for the best copper-alloy 1957 and 7087 aluminum alloy pencils fabricated in the usual manner by heating.

Considerable data on wing and tail loads have been obtained in flight using the X-1 airplane. The buffet boundary of the airplane has been tabulated and the magnitude of the buffet loads has been determined.

► **Aeroelastic Heating.**—With the achievement of supersonic speeds, consideration must be given to the design of aircraft to the heating of the aircraft by air passing around it. In this section, a comparison was made between the true history of skin temperatures measured on the nose of a X-2 rocket, and the temperature computed by using an experimental relation for heat-transfer coefficient for conical

bodies under supersonic conditions. The agreement obtained justifies the use of the latter for skin temperature calculations.

The magnitude of the temperature gradient occurring in the wing of a typical, high-speed fighter airplane has been measured during flight and an analytical method for predicting temperature variations in similar wings has been evolved.

► **Flutters.**—The methods of analysis for determining the modes and frequencies of wing-flutter modes are not directly applicable to aircraft with swept wings. An analysis which includes the effect of wing lay-up, laminar development and profile power series expansion are made for both the deflection and twist and by the use of speed-suspension coupling can detect and the energy method, characteristic equations for both quantal and unquantized vibration are derived.

Control-surface flutter at transonic speeds has become a serious problem as it tends to reduce the engine's power available and to weaken structurally the flutter surface. From wind-tunnel tests on a prototype contributing to transonic flutter, a parametric technique for computing the magnitude of the transonic flutter phenomenon has been developed.

OPERATING PROBLEMS

Modifications to an Army liaison plane, including a muffler and multi-blade, slow-turning propeller, reduced its noise at an altitude of 300 ft. from 87 to 67 decibels, making it nearly quieter than a car. These data are now available for propellers which are both quiet and efficient and are not heavier than conventional propellers.

► **Flashing.**—Earlier research on the flashing characteristics of military aircraft was extended to models of our most important types and these calculated peak flashing characteristics, generally better than losses.

Although most of the models tested had characteristics severe enough to warrant the use of the NACA hydrofoil as a starting aid, it contains a parametric device for eliminating violent flow.

► **Pitot Protection.**—The results of a preliminary survey of the aircraft pitot problem indicate that a significant solution to the problem would require that an inflatable material be made less compressible or moved from the airplane, that special sensors be developed or isolated and that the fuel be separated from potential spurious sources.

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Mockup Aids Stratocruiser Crews

An operational mockup of the Stratocruiser prop system has been built by Hamilton Standard Propeller division of United Aircraft Corp. for use by airlines in training prospective pilots and mechanics on the new transport.

According to the first to show the mockup, the Stratocruiser, a propeller governor, the mockup automatically detects failures of the prop during a typical flight.

The mockup was built with actual parts used in the Stratocruiser. Accuracy is maintained on a flat panel and the governor, drive assembly and decelerator have been built out, making it possible to observe the mechanism

Students operate the propeller via a control panel incorporating an engine, electric, prop governor control, "back" tachometer, and assigned indicator instruments register to replicate to meet needs of controls.

The prop can be set at rpm required and perform all the functions necessary for constant speed, reverse, automatic feathering and clutching during flight.

The mockup usually is being used by Boeing Airplane Co. at Seattle. Following its use there it will be assigned, in turn, to Pan American Airways, Northwest Airlines and British Overseas Airways.

NEW AVIATION PRODUCTS



Flow element (left) of electronic flow meter is shown in plastic housing to reveal details of construction. Turbine units at each end of shaft act as bearing supports and flow detectors. Bottom portion of post also component (right) is rate of flow unit which gives pulse for indicating flow per min. delivery. Upper portion a fluid rate indicator. Visual scale can also be used for graphing continuous flow rate.

Flow Meter Stresses Versatility

An electronic flow-meter embodying new concepts and simplicity has been recently announced by the Potter Instrumental Co., 1537 Academy St., Newark 2, N. J.

The unique element is a precision inert rotor. Its shaft is mounted on ceramic bearings and low friction bearings and is grinded to the fluid flow. Only minute friction losses are induced by the bearing. The rotor, coupled with the efficient position of the rotor, reduces pressure drop across the flow meter to a minimum.

► **Operation.**—An Alnico magnet is embedded in the hub of the free turning rotor. The magnetic field passes through the non-magnetic housing of the unit and produces an a.c. current as a constantly mounted magnetic pick-up rod. The present, after being fed into an electronic integrator can be used to generate a visual meter or for continuous recording to indicate flow rate. A turbine may be incorporated in the rotor which, when rotated, will automatically give a running total of fluid volume passing through the meter over any given period of time.

No pressure limitations are imposed by the unit since it may be inserted in existing lines designed to withstand operating pressures.

► **Applications.**—Rotor parts are made of vitreous enamel tubing alloy which is perfectly unaffected by chemical action. Flow meter elements may be used with fluids ranging from gas to heavy liquids.

The manufacturer stresses the unit's adaptability for outlet work, because of its light weight, adaptability to telescoping, rapid response and resistance to corrosion. It also offers advantages as a test stand device because of its high accuracy (up to 1 at 1 percent), ability to withstand high pressures and durability.

Other uses to which the flow meter can be applied are:

- **Aircraft engine fuel flow and total consumption.**—Instrumentation, when by reason of its high accuracy, fuel capacity gauge can be eliminated and more exact flight plan calculated.
- **Measurement of aircraft flow in aircraft.**—Since the unit is unaffected by altitude changes, being a noncontact device.

Long range transmission of flow data, because the moving element impulses may be carried either by radio or wire over extended distances to the recording unit.

Test flow meters have been in operation for over a year. They have functioned satisfactorily under such capacities as 100,000 lb. of water an hour with a measured accuracy of 4 of 1 percent. Ability to withstand temperatures as low as -100° F. and as high as 1,000° F. by means of liquid oxygen (-180° C.) through the unit.

Since rotor assembly may be disassembled and reassembled by hand without need for more than 5 min. in disassembling the simplicity of maintaining the unit—GAC.

Machine Shop Aid

New 7-in. bench clapper for tool-room and industrial use is announced by South Bend Lathe Works, 135 E. Michigan St., South Bend, Indiana. Plans a 18-in. long and it reported to have simple bearing rigidity in all positions. Clamping speed is variable from 3 to 110 rpm. Stroke rates of 47, 75, 123, and 207 per min. are obtained by shift key. When on duty, one position. Clamping belt tension release facilitates belt changes. Clamping position of tool is adjusted by rotating surface arm, actually lock on rim. Tool head has 3-in. feed, moves to any angle, and has positive lock. Post takes tools with shank 1/2 x 1/2 in. Work table is 5/8 x 5 x 6 in. deep. It is secured on top and sides and has holes for attaching the vice and special work clamps in various positions. Resizable power cross-feed in table stage from .002 to .015 in. per rev. stroke. Graduated plate indicates feed. Horizontal table travel is 24 in. Motor required, a 1/2 hp., 230-volt, and it mounted on cast-iron base.



Versatile Hoist

"Log-A-P" portable hoist, weighing only 88 lb., net capacity of 1700 lb. is offered by Lincoln Precision Machine Co., North Griffin, Minn., as possible solution to many of the most loading and unloading problems. Incorporating 34-in., 135 strand aircraft cable, manufacturer claims this inexpensive hoist can be rigged instantly and operated by one man to lift, pull, or lower 18 tons in 10 ft., or 1 ton in 15 ft. Chain or rope can be attached for added distance. Handle may be stored for easier rigging conditions in tight places. Replacement of damaged parts is represented in being easily accomplished with the job with wrench and screwdriver.

London Letter:

Average Briton Ponders the Cost

New budget offers taxpayer little relief; he wonders if price of worldwide air transport fleet is too steep.

LONDON—When Britain's Chancellor of the Exchequer introduced his budget for the coming year, he didn't produce any surprises like a decrease in the cigarette tax or an easing of the high level of income tax. For Average Briton the budget added up to a slight increase in the cost of his food and 2 cents a pint less for his beer—hardly mood-crashers.

Average Boston, the taxpayer, had more reason than ever to think he was becoming the "permanently forgotten man." The Government continued to spend 40 percent of his weekly paycheck as it was fit. And Average Boston has come to wonder if he gets any benefit from the way his Government spends that 40 percent.

• **Where Are The Pines?**—He might go along with the Government as its spending defense equipment, for health insurance, for food subsidies. But he could easily ponder expenses for civil aviation. Did he really want to support an ambitious workloads air transport fleet that he personally hardly ever saw, scarcely ever flew on, and at whose air fields his sons and daughters could get no information from insurance?

This month he had a fresh batch of figures to chew over: For four shillings (50 cents) he could get "Civil Estimates relating to Trade, Industry, and Transport," which contains estimated expenditure for the Ministry of Civil Aviation in the year ending Mar. 31, 1950.

According to Deaton, it isn't likely to be much more than grumble about "how much beer could have been bought" with the £22,514,000 (\$90.2 million) the Ministry of Civil Aviation will spend during the coming year. He might be cheered somewhat by the fact that this figure is £3,650,000 less than estimated expenditures in the prior past model. He might even work out the calculation (if he could find a pencil) that the £22 million represents just about two shillings a head (£2). But then he'd give up in frustration.

• **Will Call Personnel**—Let's look into these figures a bit further. Americans who see the difficulty of getting Hoover Commission recommendations adopted may be comforted to hear that the last

the Ministry of Civil Aviation also plans to economize on personnel: total number to be employed by the Ministry will drop from 3503 to 3330, and Head

question staff will be reduced from 1788 to 1718. Pugh's disclaimer comment on this "It is to be hoped that these drastic reductions will not seriously affect the efficiency of the Ministry."

Despite the strong last seasons of the November, Lord Polkington, that rigid economies must be introduced by the three British airline corporations (soon to be dominated by one with the merger of BAA and BOAC), citizens will pay for the grants of £5,916,000 (£21.6 million) to the three airlines to cover expected operating deficits during this coming year. This subsidy is down £2.5 million from last year, though, £5.9 million of this is not available for BOAC (compared to £5.25 million last year), £1.7 million for BAA (£2.5

Civil Aviation Construction Plans

	Total Cost	To be spent in 1949-50	Spent in 1948-49
Belfast (Notts Central)			
Additional accommodation	£136,000	£40,000	£55,000
Blackheath			
Runways, buildings, etc.	20,000	2,500	30
Bourne			
Additional accommodation and extension to runways	902,000	124,000	21,400
Cirencester			
Additional accommodation	195,000	5,000	26,500
Edinburgh (Turnhouse)			
Runways and buildings	508,000	447,000	2,500
Hurn			
Additional accommodation	498,000	45,000	8,500
Kelowna (Hinton)			
Additional accommodation and runways	150,000	102,500	26,500
Liverpool (Speke)			
Airons and buildings	48,000	7,000	12,000
London Airport			
Development of airport			
Preliminary estimate	20,000,000	3,205,000	1,588,000
Manchester (Ringway)			
Runways, buildings, etc.	1,145,000	104,000	17,500
Northolt			
Additional accommodation	615,000	115,000	46,800
Oriskany			
of Staff housing	100,000	60,000	
Runways and buildings	318,000	51,000	218,400
RAF Cranwell			
Runways and buildings	1,600,000	208,000	7,500
Scilly Isles			
Additional accommodation	15,500	8,500	
Southampton Witter			
Munroe base	20,000	5,000	13,500
Stansted			
Construction of buildings, etc.	30,000	50,000	
Wormwood			
Additional accommodation	15,000	7,000	50
Minor New Works, Additions and alterations under £30,000 each			
1948-49	1,000,000	97,000	53,510
1949-50	1,000,000	10,500	16,650
Urgent unknown works			
		£4,675,500	£2,137,500

(Revised 1 is worth approximately 54.05)



America must lead in aircraft design

In speed, range and load-carrying ability, Aerostar's newest military airplanes must continue to be superior to those of any other nation. Whether or not we have the biggest Air Force, world peace and national security demand that we have the best.

Our leadership in aircraft design has its roots in the national character and the democratic system of free competition. America's aircraft industry has attracted thousands of the

bravest young men in the country. They combine daring imagination with disciplined skill. Daily they dare the impossible—and make it work.

Why? Because our competitive system gives them incentive. Boeing engineers are constantly aware that they must exceed an alert, vigorous competition. Such incentive gave America the B-17 Flying Fortress and the powerful B-29 when they were most needed.

Any system that boasted that increases would inevitably extend programs in the air.

Boeing is proud of its pioneering record in design, and of the engineering integrity that gives meaning to Boeing-built aircraft. Today's flagship B-70 Superbomber, the world X-15, Strategic, and the C-17 StratoLifter, like the famous B-1 and B-52, are pledges of still greater Boeing planes to come.

For the Air Force, Perry is building the B-50 Superbombers, B-47 Stratojets, and C-119 Flying Boxcabins—for the Army, the L-18 Scout Bombs along with the six main ordnance, the tank-like M48 Patton tank.

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low last year) and a loss £250,000 for BAAA (£240,000 last year).

The British airport payments separate from subsidies—a bookkeeping point which the American Civil Aviation Board has been urged to adopt. These annual payments show up in the "Estimates for the Post Office," which indicates it will be paying £4,875,000 for overseas air mail carriage, and £175,000 for external air mail—about £5 million more, in total, than last year.

Expenditure charged to the Ministry of Civil Aviation for research and development are already has dropped in coming year. Expenditure down to £4,616,000 compared to £50,514,000 last year. In the main this change represents program on events for work on the Bristol Blenheim and the Sunderland Freighter—two flying boats (B170). Suitable taking all accounted for by completion of the large assembly hall and specially reinforced runway for the Blenheim at Filton.

► **Buy Show-Average** Britain can't say he hasn't a chance to see an airplane if the show are full of them, thanks to the Dutch, Belgians, Danes, French, Swiss, and of course the Americans, as well as planes leaving the British Empire field.

He can even go out on a Sunday with his whole family to the Ministry of Civil Aviation's airports, pay a shilling or so, and spend the whole afternoon to the public audience watching them.

► **New Conventions** do more near fields, but likely to see aviation, weapons, intelligence, etc.—evidence of construction work. The Ministry of Civil Aviation isn't standing still. It plans to spend £10 million in 1954 on new buildings, additions and alterations to them, in the coming year (see table). The figure is just double that of last year.

Airport lighting and navigational aids also about another £10,000, five times last year's amount. Land and buildings purchases will rise £3.5 million, against £1.5 million last year.

In addition, the British will be contributing £2 million toward construction and maintenance of ground services on Commonwealth routes, £250,000 to support of the Air Ministry's Meteorological Office.

Average Britain probably won't plough through the Estimates to the letter and, if it did it might be somewhat chided to have that total gross expenditure of the Ministry for the year is £15 million, but not cost is reduced by more £4 million. That a made up from some sources as higher landing fee of £500,000, another £100,000 from income from fees to the public audience at Ministry airports and catering, communications and £2.2 million from losses of assets owned by the Ministry.

—Franklin K. Rowlett



Feeder Routes for Remote China

Civil Air Transport will use single-engine Cessna 195 to connect points in Tibet and Mongolia with Lanchow.

LANCHOW, China — Northern China, a land of great oases and meek rivers, will shortly get an transport Civil Air Transport, headed by Gen. Chou L. Chen, a military leader, a demanding establishment of feeder service to connect a half dozen points scattered at remote of China to Lanchow, the metropolis. The region lies in Tibet and Mongolia, and is virtually without communication.

So Cessna 195 single-engine piston planes built especially for low-cost operations, will be used by CAT. Based at Lanchow, which is located in coastal China by C-45 transports, they will fly to Suining, Ninghsia, Wuwei, Yumen, Saitan, Pinghsia, Tientsin and other places.

► **Accept Facilities**—Some of these cities already have airstrips, built during the war against Japan, others are building them. Cessna 195 requires only a small strip for landing and takeoff. Where there are no facilities, CAT plans to build them.

Writing Wallace, executive vice-president of the line, declared that even

though aviation had declined to Northwest China costs about \$3 a gallon, air freight charges are lower than truck transport costs.

Wallace claims one C-45 has the carrying capacity of 100 trucks. If these figures are directly applicable to the smaller Cessna, that would be about \$0 to 1. Because of weathered roads, it might take a truck a week to go from Lanchow to Ninghsia, or two weeks for the round trip. A plane can fly between these points in about 90 minutes, and could make three round trips a day, or about 800 in the two weeks a truck would need for a single round trip.

Wheat and tea are major vehicles in the Northwest as a serious problem, but maintenance of planes is no different than anywhere else, Wallace said.

► **Cost Experiments**—Airline gear has been brought by motor conveyance from Canton to Lanchow by way of Kweichow, Kweichow, Chongqing, and Hanchow. Where there are no facilities, CAT plans to build them.

Experiments will be conducted by sending gear from the Yumen oil fields of

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Korea province with imported aviation fuel to try to stretch the supply, Waller said.

Outbound planes will carry wool, the most important product of the Northwest, besides, fine Tibetan and Mongolian shawls, and passengers. Inbound craft will carry auto parts, tires, medicine, and various manufactured goods. The Cessna 195 has a range of 600 to 900 miles and carries a payload of approximately 1800 lb.

► **Flies, planes.**—Two Cessnas have already arrived in Canton and others are en route by ship. They will be flown to Lanchow.

CAT is studying possibility of allocating two of them to Southwest China, using Kowloon as operations center. Flights would operate to Kowloon, Pao shan, Mengzi, Lichang, and perhaps to Hsinching, Tsing Ching, and to points in Burma.

Southwest flights are likely to be largely a passenger operation, according to Waller, but he expects the mines at Mengzi and rice deposits near Lichang to provide the airline with business. Lichang water, which makes a high grade insulating material, was flown across the Hump to India, then to the United States during World War II.

The fuel lines are being set up on an assumption of noninterference by the Chinese Government, presently a considerable distance from contemplated routes. If Kowloon takes the Northwest, they would likely prevent CAT operations, although at the time has flown great quantities of supplies to such Nationalist cities as Yunnan, Moulun, and Chongqing—far more, in fact, than the other airline in China.

—Nancy Landon

Claims Fourth Place

BOMBAY—Indian government claims fourth place in civil aviation among nations of the world, according to 1946 air transport figures.

Seven companies, operating over 22 routes, carried 361,610 passengers for 13.5 million flight miles last year, compared with 250,000 passengers, 10 million flight miles in 1947 and 100,000 passengers, 4.5 million flight miles in 1946.

New Airport

ADDIS ABABA—A new airport is being built in the Ethiopian high country at Yehala in order to be within easy reach to and from plateau air. Construction of the airport is under the supervision of Richard Gies, an American engineer.

On the Globe-Girdling B-50 "Lucky Lady II"—

Safety Glass

By "PITTSBURGH"



The pilot's cockpit (above the elevator) is glazed with Pittsburgh Safety Glass. It withstands the tremendous load and wide temperature variations. Special glazing techniques secure extra strong joints of the multiple curved segments, prevent frost mounting, provide a smooth outer surface. Since the glass is optically "perfect" the pilot has unobstructed vision through pane even at extremely steep angles. Photos by International News



THE "LUCKY LADY II" is shown banking down on the runway at the end of its round-the-world flight, one of the greatest pioneering feats in aerial history. The pilot's cockpit is entirely enclosed in special curved type Safety Glass, one of the many developments in airplane glass and glazing methods pioneered by "Pittsburgh."

Two leaders of the B 50 had unusual glazing problems in equipping the plane to meet the unique physical conditions encountered in high altitude flight under high pressurization. These problems were solved by transparent products and advanced glazing techniques which were suggested by "Pittsburgh."

Pittsburgh Plate Glass Company is continuing its aggressive product development program, to meet ever-changing needs of the aircraft industry. Manufacturers of many types of military and large commercial planes are now using transparent plas-

tic, photographic glasses, pressure bullet-resistant glasses, thermal type Safety Glasses and double-glazed Safety Glass, all developed by "Pittsburgh."

Our complete research records, our unexcelled manufacturing equipment and our constant many-years of glass-testing experience are at the disposal of all airplane manufacturers—however large or small.

When you are concerned with Safety Glass and glazing methods for airplanes, bring your problems to "Pittsburgh" Pittsburgh Plate Glass Company, 2160-G Grant Building, Pittsburgh 18, Pennsylvania.



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► The new behind the scenes of recent record flights by the U.S. Air Force's heavy bombers is...

1) most of these four-engine planes are equipped with Curtiss-Wright Electric Propellers.

2) The selection of these propellers is a result of Curtiss-Wright's wide background and continuing leadership in propeller design.

► With Curtiss-Wright equipment... The Lucky Lady II—first B-50—few 23,412 miles non-stop around the world.

The Parasol Doctor, B-29,

flew non stop across the Arctic, Blandholm to Gales.

The Enola Gay B-29 dropped the first A-Bomb on Hiroshima.

► The B-29 propeller has four blades, is 16 feet, 8 inches in diameter and provides electrical deicing, reverse thrust, automatic acceleration, hollow steel blades and selective fuel pack... Curtiss-Wright power of and service proved on record flights.

► The selection of Curtiss Propellers for the U.S. heavy bomber fleet highlights their performance on all types of military aircraft.

► All Curtiss-Wright Propellers are products of the versatile knowledge and skill acquired through many years of experience in engineering and building propellers for airplanes ranging from single engine lighters to multi-engine piston bombers and transports.

► Curtiss-Wright propellers are built to the highest standards of quality and performance. They are built to the highest standards of quality and performance. They are built to the highest standards of quality and performance. They are built to the highest standards of quality and performance.



CURTISS ELECTRIC PROPELLERS

PROPELLER DIVISION • GARDEN CITY, NEW YORK



PRODUCTION



Kaman's output to date, the experimental K-121, prototype K-190A and first production K-190B. In over the Bradley Field, Conn., plant.

Kaman Plans Wider Copter Use

Newly-certificated manufacturer to offer operators a leased "package" with fee based on flying hours.

As the newest competitor in the still two-wheel helicopter market, Kaman Air Craft Corp. thinks it has to do something out of the ordinary to draw up business. Immediately after getting its K-190 utility copter certified, youth full president Charles H. Kaman told the press:

"Kaman will lease to operators a 'turn-key package,' including helicopter, pilot, mechanic, maintenance, gas oil, and insurance for a flat monthly rate plus a fuel charge per flying hour computed on a steady basis.

Program was developed after a nationwide survey by Kaman and some of its on wheels indicated that helicopters demanded a low become.

► Prices of machines are out of reach of the average operator.

► Breaks are reluctant to put up \$100,000 plus for several helicopters to put in operation as a business investment.

► Maintenance costs usually exceed expectations.

► Pilot rates which, according to Kaman, are constantly rising, make it difficult for operators to keep accurate annual income and expense.

Prime advantages of the leasing arrangement, Kaman states, are that operators don't have to place large initial investments in equipment, can accurately forecast their operational costs in advance, and are able to replace new unit fly helicopters with some degree of certainty.

He also points out that, besides giving operators a solid foundation to work from, plan permits his company to control service operations of its equipment. Ultimate effect of leasing program, he feels, will be lower helicopter prices throughout entire industry.

► Details—Under plan, lessee must put up \$3000 to \$10,000 in advance to establish "financial responsibility." Although advance payments eventually will be deducted from charges to operators, money will give Kaman a head start in paying for initial costs.

According to the company's rough estimates, an operator leasing three helicopters, each guaranteed for 100 hours of flying service per month, will be charged \$10 per flying hour for each unit, or \$9000 per month. For costs are of fuel, pilot's and mechanic's services, maintenance, insurance, etc. For gas up with lesser ships leased and less hours contracted to 50. For instance, a single ship leased for 70 hours per month costs \$40 per flying hour.

Kaman eventually plans to have one helicopter held in reserve at his plant for every fee unit that he has set on lease.

► Set for Summer—Company intends to be out of leasing program by a limited scale this summer. A number of units are in various stages of production at the Windsor Locks, Conn., plant, with flight tests scheduled for some within the next few weeks.

In order to meet deliveries, company

has increased personnel 30 percent, is operating on two shifts, and has broadened its manufacturing sub-contracting program.

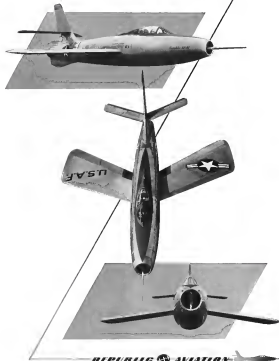
Kaman already has closed leases with five cop-during operations on the East Coast and is negotiating with others. He plans to deliver six models by July 1, solely for lease purposes. Another six units (leased out separately) will arrive in August as scheduled for shipment within the next four months. Company also is negotiating with Texas firms which may buy several K-190s for oil exploration. Total production for 1949 is expected to reach somewhere between 15-20 units.

► Dismantling Costs—Company officials explain that three K-190s can cost about \$170,000 each for a total cost in operation of \$1000 per hour or \$15 per hour. Previous price for this service, they claim, is around \$100 per hour.

They list several tests with flat model to be equipped with cop-during equipment (leased out separately) will arrive in August from interesting notes, they said, apparently some chemicals to be applied more evenly on ground than with other types of helicopters.

Company is experimenting with night-seeing operations which, given more time would be better because chemicals adhere to crops more effectively when there is added moisture, but jet involvement in the air. Signal, night-lighting and special equipment problems are being worked out at farms near the facilities.

Along with announcement of the leasing program, Kaman stated that the \$75,000 price quoted previously for the new unit "is withdrawn." Although he did not state what the new price would be, he hinted that it probably would be less.



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SALES & SERVICE

Engineers Study Lightplanes

IAS is urged to provide more action and thought, less talk about problems of personal airplanes.

WICHITA—Thinking and doing something about problems instead of trying to figure out what a wrong self-statement was the focus of the sixth annual personal aircraft meeting of the Institute of the Aeronautical Sciences at Wichita last week.

Kenneth Rank, Wichita University retirement research chair who actual is program chairman, said the average engineer is used at picking light with which, now he wants to do something about what's wrong.

► **Stable and Safe**—The old story of safety and pilot before discussed to pay up during the meeting, however, and Dr. C. C. Farns, director of the Cornell University aeronautical laboratory, said that there is still a lot of work to be done to prevent such. He pointed out that 45 to 50 percent of the fatalities in personal planes are caused by stall spins.

"Flying," said Dr. Farns, "is the most difficult thing man has ever attempted," and he urged designers and builders to stop working solely as "a safety subject" and to employ every effort to increase it. He and shoulder safety steps have become a necessity and more work must be done to insure them against power failure. Some 22 percent of the crashes resulting in 1944-45 were the result of powerplant failure, with only 2 percent from structural failure.

► **Passenger Seat**—Eugene W. Rank, Washington representative of the Flight Safety Foundation, told the meeting that the high cost and "lack of safety" of the light personal aircraft are "grossly exaggerated" (Aeronautics Week, May 2).

"Responsibility for this exaggeration, but with proponents of the 'motor boat' philosophy and those who have encouraged the public to seek 'valley' without legitimate use. Although many technical and social problems face personal aviation today, none of these is insurmountable," Rank said, adding that a realistic attitude toward the personal airplane's current limitations and advantages should encourage broader acceptance by those who profitably can utilize today's airplane today.

Dwaine Walden, General consultant, forecast a bright future for lightplanes. "Our potential is tremendous if we are

to satisfy the transportation needs of people who have real traveling requirements."

Walden and the personal plane takes its owners to any place in less time and for less money than any other form of transportation. In his own experience, he and his few light plane in every phase of the country, 32 percent built by Ray Young, in his spare time. The incorporated several innovations, such as a welded aluminum gas tank (using 14 lb.), for a total weight saving of over 200 lb. in the aircraft.

► **Plane Development**—Development of the Anderson Greenwood AG-14 was described by Milton Greenstreet. The two place light plane was designed with the philosophy that few improvements could be made in speed and load-carrying characteristics, but a better "observation platform" was needed.

"I don't want to say it's not possible," he said, "but it's not easy." Speed and load-carrying was one of the most important problems to overcome. The development phase of the 14 is now over, and production models are nearing completion.

► **8 D Hays**, chief of the Boeing propulsion development unit, described development of the 2600 hp gas turbine engine. He said there are some undesirable features which are not to be solved. One of these is the noise factor, resulting from the large air consumption. "Large intake and exhaust facilities become an end in themselves," he said, and no solution to the compressor inlet noise problem has been found. Performance wise, however, the turbine outdistances other engines. It is practically silent and cannot be killed.

Other speakers included J. W. Miley, Rank who discussed development of the Beechcraft Twin-Quest powerplant; Lloyd L. Long, Jr., Beech; The Problem of Rock Force per CF, and three Air Force and Army officers.

522,800, which included all tangible assets of the company. Several feelings and enough parts to build at least three planes were included in the deal.

► **Production**—An almost half-finished as the first two tandem triaxial, a 65 hp stock model and a 90 hp model. However, a Call employee has been given the findings and other components of the Interstate S-3, a coupe type, two place, side-by-side, aircraft, which he will complete on his own initiative. If it proves to be a good design, the chances are that more will be built on custom order.

► **Interstate Plan**—This procedure is typical of a Call "interstate" plan whereby employees are given an incentive to experience both for their own use and company program. Another employee is the new model of the Call Air A-2, a 1200-hp powered three place, which was built by Ray Young, in his spare time. The incorporated several innovations, such as a welded aluminum gas tank (using 14 lb.), for a total weight saving of over 200 lb. in the aircraft.

► **Additional new Call Aircraft products**—Two new two place, light aircraft, called the Call Air A-2, and a line of motor scooter in line with the Call Air A-2. The new Call Air A-2 is a two place type that fits over the wheel of an airplane in less than a minute.

French Contest

Seven airplanes, thirty French and thirty foreign, will be submitted to the first postwar French light aircraft racing contest, sponsored by Fédération Aéronautique Française July 2 to July 10.

► **Eligible to participate**—two place with 2200 lb maximum gross weight; three seater with 2975 lb maximum gross weight; and four seater with 3975 lb maximum gross weight. Each plane must carry full complement of passengers in addition to pilot. Competition will be permitted to depart from these planes of the same type. Some of each class will be determined at the end of the 2000 mile circuit course.

American manufacturers or individuals making to compete should make arrangements for entries immediately with the Fédération Aéronautique Française, 1035 Connecticut Ave., Washington, D.C. American FAI representative "Estrine" must be forwarded to arrive at the Aero Club de France, Paris, not later than 16:00 GMT May 16. Entry fee of 5000 francs per aircraft plus per aircraft for each seat in the aircraft, is payable in advance.

Call Will Market Two Place Trainer

Call Aircraft Company, Alton, Wyo., will be marketing a postwar version of the old Interstate Cadet, a two-place, two-place trainer. It will be named and sold as the Call-Air Cadet. President Rank said he anticipated purchase of the Interstate type certificate last summer at a reported price of

with light-gauge openings, thereby will be considered to be a standard angular feeder system with transport equipment.

ALPA Protests Prop Feathering Devices

Charging that the Civil Aeronautics Administration is abusing its discretionary powers in the certification of new aircraft, the Air Line Pilots Ass'n has called for Civil Aeronautics Board action to curb the alleged threat to air transport safety.

Specifically, ALPA President David L. Beldine has complained against the Administrator's certification of three postwar transports equipped with automatic propeller feathering devices. But besides asking CAB to take immediate steps in that case, the union chief urged the Board to reject the AIA's statement "that making any future change in the Civil Air Regulations is the guar of establishing equivalent standards of safety."

ALPA Aggravated—The Civil Air Regulations, the pilots insist, provide that to meet specification accuracy for aerodynamic certification a plane must be able to "divert out" notwithstanding engine failure at a certain point during takeoff. Using the automatic propeller feathering devices (first on the Cessna 441s, Martin 2-0-2 and Boeing Stearman) to fail as become necessary, the plane would not meet the certification in the requirement according to the union.

In approving the automatic propeller feathering installations, the Administrator found that they would provide a standard of safety "equivalent" to that required in the regulations. Beldine claims that this conclusion assumes that the mechanical device will never fail under any condition.

"If it does, there is definitely no margin of safety as contemplated by the regulations," the ALPA head continued. "It is the duty of the Administrator to follow the orders and regulations of CAB. In this case, his action has amounted to changing the meaning of the regulations, not enforcing them."

Beldine's Not Equipped—Beldine said that the Administrator made his ruling without giving notice or setting comment from the airlines, the aircraft manufacturers, the pilots, or other interested parties. Some CAB officials have said they have already advised the airlines of the propeller feathering device since it was issued in June, 1947.

Since then, CAA estimates, there have been "about a dozen" incidents in which the devices have failed, "all involving the Cessna 441s." There

have been cases in which the device failed to feather the propeller when it was supposed to, and instances in which the propeller was feathered when it was not supposed to, CAA stated.

►No Dangerous Situations—CAA officials told Aviation Week that no really dangerous situation has arisen through failure of the automatic feathering device. They said they've started a CAB investigation.

Airline Finance Record Defended

Rampeck denies the charges of mismanagement and extravagance; claims postwar costs have dropped.

A vigorous rebuttal to charges that the controlled airlines have been mismanaged and extravagant since the postwar period has been made by Robert Rampeck, Air Transport Ass'n executive vice president in testimony before the Senate Interstate and Foreign Commerce Committee's investigating subcommittee on Finance.

Despite inflation, the domestic scheduled airlines reduced their cost per available ton mile from 32.15 cents in 1946 to 31.15 cents in 1948, Rampeck declared. It is 30 cents spending inter-

nationally and overseas on their cost per available ton mile from 67.65 cents to 65.25 cents in the same period. With far and all new equipment and procedures, employee productivity has increased substantially.

►Newsletters Replied—The AIA executive has made charges in letters before the committee by representatives of noncontrolled lines. He stated that the controlled airlines are a self-payee industry devoid of incentives to be economically successful. "The controlled airlines have nothing to apologize for," he asserted.

The flight of Rampeck's testimony, a full Saturday before the domestic controlled airline's average total ton-mile revenue had dropped from 41.5 cents in 1947 to 31.1 cents in 1948 and 30 cents in 1949. This reduction was due primarily to sharply lower fuel prices. In 1948, the domestic trunkline received an average of 52.14 a ton mile for fuel cost. The figure dropped to 38.5 cents in 1949 and in 1948 was back to 52.15—still well below prewar levels. Fuel pay for American flag lines fell from 35 cents a plane mile in 1947 to 45 cents in 1948.

►Auto and Fares—While emphasizing its open air transport field to the main carrier, the controlled airlines have kept low fares and kept rates at a minimum. Airline passenger fares are only 11 percent above prewar levels, compared with 31 percent increase in full coast fares, 23 percent in rail fares, and 15 percent in interstate bus fares. Leaving costs generally have risen 65 percent. Domestic Air Express receipts dropped from 55 cents a ton mile in 1947 to 32 cents in 1948. Freight pay for U.S. domestic freight dropped from 40 cents in 1947 to 25.75 cents in 1948.

►Personnel—Employees on the 16 domestic trunklines were reduced from 65,135 in December, 1946, to 59,800 in December, 1948. The carrier is expected to lose out back from 27,753 employees in 1946 to 21,317 at the end of 1948. Telling

the domestic and international carrier together in the two post war years 1946 the number of employees decreased 35 percent while average ton mile revenues increased 25 percent.

►Revenue Increases—In a period of declining fuel, the airline industry, the domestic trunkline, with an increased annual income from \$202 million in 1946 to \$329 million in 1947 and \$364 million in 1948. U.S. international and overseas airlines increased their annual revenues from \$21,760,000 in 1946 to \$174,500,000 in 1947 and \$191,293,000 in 1948.

►Cost to Government—During the entire history of an mail service, from 1918 through 1948, the general aviation has sustained a net deficit of \$235,047,000 on the operation. By comparison, the government spent over \$230 million during the last two years to increase and improve the governing of air in this country. "I suggest that the development of the first air transportation system in the world is worth at least as much to the people of the United States as an adequate supply of bread."

►Dependability of Service—On-air performance has increased 55 percent for the domestic carriers during the postwar period. In December and January of 1946-47, 492 flights were delayed by more than 15 minutes as a result of 11 minutes each. During the corresponding period a year later, only 355 flights were delayed in numerous instances was delayed an average of 11 minutes for each flight.

►Government Assistance—Largely through their own efforts the domestic trunkline reduced their losses from over \$20 million in 1947 to about \$1 million in 1948, while the international carriers have turned a substantial profit less than a modest profit for 1948. The situation could be improved further through government consultation on Revolutionary Finance Corp. loan commitment of legislation for government financing of airplane development, services between metropolitan markets at legislation lowering control costs under CAB regulation, repeal of the 15 percent transportation tax, pending legislation giving CAB exclusive jurisdiction of interstate air carrier's operation of state aviation programs.

►Political Outlets—While covering much of the news ground as Rampeck, chief executive of Northwest Airlines, in addition made one of the strongest defenses of air carrier service which has yet been heard from an industry spokesman. He said that the industry is not a monopoly.

Answering the committee's question of why the airline industry is as such

poor financial condition, Rampeck said,

"The present passenger rates of the airlines have put them out of the main travel market. We have a basic average loss of 5 cents, which is about 7 cents per passenger mile with the tax added. Unless the war air average passenger fare, including mail and travel card discount, was slightly over 40 cents per passenger mile, I believe passenger fares at this level would be unprofitable immediately to such an extent that profitable load factors would be strained on all airline equipment."

Replied on our each passenger rate that about 45 percent are new air travelers and would not have taken the trip if it had not been for the cash fare. For the last 15 days of April last quarter service increased in passenger miles about 1 percent, while the total passenger revenue for the quarter increased passenger miles up to an increase of 25 percent over the same period in 1948.

New Hope Seen For Large Nonskeds

Large nonscheduled carriers who are fighting the Civil Aeronautics Board's award action drastically limiting their operating authority have obtained new encouragement on Capitol Hill.

Sen. Guy Gillette (D., Ia.) introduced a resolution in the Senate stating that "Non-scheduled aircraft lines which have filed applications for aircraft certificates with CAB should be permitted by the Board to continue service to the extent that they are presently operating." The bill would be considered as a "floor application." Co-sponsors of the resolution (which does not have the effect of law) are Senator Wayne Morse (R., Or.), Hiram Boren (D., W. Va.), James Murray (D., Minn.), William Langer (R., N. D.), and Hubert H. Hensley (D., Minn.).

►Letter to O'Connell—Sen. Pat McCarran (D., Nev.) sent a letter to CAB Chairman Joseph C. Gurnea, Jr., stating that the Board's conclusion on the large irregular operators be deferred pending Congressional action on legislation covering regulation of non-scheduled carriers. "My study of the new CAB action leads me to believe that many of the large irregular carriers which have rendered substantial service is air transportation not so much the regulation," McCarran declared.

Previously, (Aviation Week, May 21 Sen. Edwin Johnson (D., Colo.), chairman of the Senate Interstate and Foreign Commerce Committee, had urged that O'Connell's bill not be passed. He said that the bill might be found to permit unsound operations by large irregular carriers

pending decision on their non-CAB applications.

►Court Decision—Meanwhile, the U.S. Circuit Court of Appeals for the District of Columbia has reversed a CAB suspension order against Shenk Airlines, one of the regional non-scheduled airlines. The court held that CAB's action (taken without a hearing) was without due process of law, and that case was remanded to the Board for trial.

CAB's power to suspend a non-scheduled carrier's letter of authorization after proper hearing was not challenged by the court. The Board's suspension of Shenk Airlines' letter of authorization for eight months ago, had been stayed by court order pending decision on the appeal.

China Lines Continue Despite Red Victory

(McGraw-Hill World News)

SHANGHAI—United Airlines' report on Shanghai, China will continue to have international and domestic airline service regardless of political situation. Both Northwest Airlines and Pan American Airlines declare that they will continue to operate into Shanghai until they are told to get out, on order on one aspect from China's Communists.

Less than a week after the Communist victory in China on the government-owned National Aeronautics Administration (CNAA) and Civil Air Transport Corp. (CATC). Both said they intend to remain in the country as they will continue to be the National government, headed by temporary president Chiang Kai-shek. He is expected to organize a government with the Chinese Communists and negotiate with a coalition government, then the way would be clear for resumption of both airlines to China.

►Dead End—Clean L. Channon's Civil Air Transport (CAT), however, is practically a dead end. Channon is recognized on both sides as being one of the non-scheduled side in China's air line. In recent weeks CAT pilots have made direct stops in Shanghai after nearly 1000 hours have been kept for jobs after the CNAA or CNAC, in outside China with Philippine Air Lines and other Asian airlines.

Northwest and Pan American have small installations in China and run that it is not a part of the CNAA or CNAC. Northwest and Pan American have small bases of operation in Canton and Hongkong, but both are simply protecting useful equipment. These two airlines think that their future is assured in the CNAA or CNAC. As a result, they would go back to work. As a result, they would go back to work.



BURBULE ON JETS

Columbia between British Airlines and new jet service is scheduled in the future takes recently at Hattfield, England, when the British Aircraft Co. is working on 16 Comet (DH104) transports, which are expected to come across the Atlantic at about 316 mph. The 50th Boeing, newly ordered by the British, is now being delivered to the airline. The airline's new Boeing 707 (440) is shown during the Comet project with Mr. Frank B. Hattfield, chairman and technical director of the British Aircraft Co. (BAC) and Mr. S. Hattfield, president of British Aircraft Co. Ltd. The airline is expected to make its first jet flight this year and to come into active operation in 1952.

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WEST TIME—STOP AT ATLANTIC

tows, O., to Pittsburgh, the plane was flying at about 4000 ft. when the right fuel warning light came on and the right engine stopped. The captain, who said he believed there was a fuel pump failure, turned on the cross-feed valve, and the engine started the mumble pump. When there was no response from the right engine, the captain turned the cross-feed valve off. Meanwhile the left fuel warning light came on, and the left engine stopped.

Investigation disclosed no evidence of mechanical failure or malfunctioning of the plane or powerplants. It was found that both engines had been on credit on the right main fuel tank from the time of departure from Detroit until the engine stopped, which provided the emergency landing. Thus fuel was exhausted from this tank.

Fuel Supply Adequate—Although more than an adequate fuel supply for completion of the flight to Pittsburgh was available in the left main and left auxiliary tanks, an attempt was made to reduce the fuel supply to the extent by switching to these tanks. The result was that when the left engine stopped he put the fuel master control into what he thought was "emergency stop" position. But CAB found that he may have placed the master controls in "idle cut off" position instead.

5717,923 during first quarter 1949, compared to a \$582,517 net loss in the same period last year when NAL paid more on strike and the DC-6s were grounded. Operating revenue rose to 234 percent. The company earned net revenue percentage during March that in any previous month in its history.

► **Northwest**—Flt. 1,718,862 revenue passenger miles in March compared with 3,477,354 in the same month last year.

► **Northwest**—Will change standard fare on its Boeing Supercoasters, which are slated to go into service on the Chicago-Toronto route in July. Board of directors re-elected all company officers at a recent meeting and stockholders approved a \$33 million refinancing program to cover Supercoaster purchases.

► **Pan American**—Plans to start three-week New York-Manila service June 1 with stage at Boston, the Azores, Lisbon and Barcelona.

► **TWA**—Cargo and passenger business from the U. S. to Central America both increased or 100 percent in 1948 compared to 1947.

► **Trans-Australia Airlines**—Average 11 hr. refueling delay with its Convair 440s. TAA now claims to be operating the world's largest domestic network, 13,151 unrefueled route miles.

► **Trans-Canada**—Company's DC-58 (North Star) aircraft are being modified to reduce the noise level.

► **TWA**—CAB has approved Ralph S. Bennett's election as director of Goodson Tire & Rubber Co.

► **United**—Plans to offer new and 16-day all-expense Rocky Mountain vacation from any point on its system starting June 17.

► **Western**—March revenue passenger mileage was up 1.31 percent over the same month last year.

CAB SCHEDULE

May 8—Harris to Boston via New York, refueling stop at New York.

May 10—Boston to Los Angeles via New York, refueling stop at New York.

May 12—Boston to Los Angeles via New York, refueling stop at New York.

May 14—Boston to Los Angeles via New York, refueling stop at New York.

May 16—Boston to Los Angeles via New York, refueling stop at New York.

SHORTLINES

► **BOAC**—A fleet of six Constellations and four Liberators operated over the Atlantic by the Canada Western division earned \$4.5 million in dollar revenue last year in addition to about \$8 million in sterling revenue. Receipt of ten Boeing Supercoasters during the second half of 1948 will increase dollar revenue capacity of BOAC's Western division fleet by nearly 500 percent.

► **Canadian Pacific Air Lines**—Dispatched the first transatlantic and emergency flight over its Orient route. A CPA Canadian Four reached made the run from Vancouver to Hong Kong via Tokyo and Shanghai.

► **Capital**—The Supreme Court has refused to remove a lower court decree which held that CAB was right in refusing to make retroactive adjustments in Capital's mail pay. Company has organized service in Charlotte, W. Va.

► **Chicago & Southern**—Plans to make no expenditures this year for new or additional aircraft.

► **National**—Reports a net profit of

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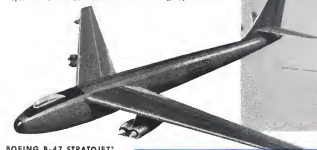
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